REMARKS

The specification has been reviewed, and several corrections have been made therein to provide improved clarity with respect to the operational description of the invention. The corrections in the specification are not believed to involve introduction of any new matter.

More specifically, lines 15-16 of page 15 reference the "diameter of the rounded bottom wall as indicated at W" when discussing Figure 5. The reference "W" was omitted from the original drawings, however, and hence has been added in Figures 5 and 6 to clarify the disclosure.

In addition, the description of the invention as appearing on pages 15-16 references the "convolutions or loops" appearing in Figure 6, and hence the specification and drawing have been amended to refer to these convolutions or loops by the reference numeral "50". The space between adjacent convolutions, in the lengthwise direction, which is the "lead" or "forward advance per convolution" as defined in paragraph [0047] of the specification, has also been designated by the reference character "S" as added to Figure 6.

Regarding the amendment to paragraph [0047] of the specification, referencing the lead S being smaller than the width W, this is supported by the original disclosure, both in terms of the specification and drawings. The disclosure clearly illustrates in Figure 5 the discharge spray in transverse cross section having a width which is a substantial part of the channel width, which language is also supported by the specification (see paragraph [0048], top of page 16). Further, the same paragraph of the specification, namely paragraph [0048], page 16, states that the spray contacts the mass "over a similar distance in a lengthwise direction of the channel", meaning that the spray has a similar contact dimension with the surface of the flowing mass both transversely and lengthwise. And, paragraph [0050], page 16 states that the spray zone contacts the mass over about one to

one and one-half convolutions which, since this is a lengthwise dimension of the spray zone which generally corresponds to the widthwise dimension of the spray zone, hence clearly points out that the lead or advance distance of one convolution is less than the channel width or diameter. This is further confirmed by the illustration of the convolutions as appearing in Figure 6.

The amendments as incorporated into paragraph [0047] are accordingly supported by the original disclosure, and hence do not involve introduction of new matter.

With respect to the claims, all of prior Claims 1-28 were rejected based on German '680, either under 35 USC 102 or 35 USC 103. Some of the claims were also rejected as indefinite under 35 USC 112.

The prior art rejections based on German '680 are believed erroneous since German '680 is not believed to teach or disclose the basic process which is the subject of the present invention. However, to expedite further prosecution of this application and to provide better clarity with respect to the definition of the invention, all of Claims 1-28 have been cancelled and replaced by Claims 29-45 as presented herein. The latter claims are all directed to the process associated with the present invention, and are believed to define the invention in a manner whereby they distinguish over German '680 under both 35 USC 102 and 35 USC 103. These claims are also believed in compliance with 35 USC 112 since the undersigned has attempted to address and avoid utilization of the "small distance" terminology which the Examiner previously found objectionable. Further and favorable consideration of this application is respectfully requested.

As close study of German '680 reveals, the principal purpose of the German '680 arrangement is to provide a single apparatus which permits both tumbling treatment and blasting to be carried out, rather than utilizing two separate apparatus which is another conventional technique, as described in some detail in German '680 (see the Background

comments presented on pages 2-4 of the English translation). The purpose of the single device disclosed in German '680, however, is still to permit separate blasting and tumbling treating operations to be carried out, either by themselves or substantially simultaneously, although when simultaneously carried out the two treating operations are still distinct from one another.

More specifically, German '680 illustrates in Figures 1-2 a preferred embodiment wherein, at the end of the vibrating trough or channel 2, there is provided a dam 5 which extends transversely across the channel. This dam, as shown quite clearly in Figure 2, has a bottom dam section which angles upwardly across the channel in the flow direction, and this bottom dam section then joins to a top dam section which projects vertically upwardly across the channel so as to terminate at an upper free edge which is spaced a substantial distance above the bottom of the channel. Accordingly, as the mass or parts is helically tumbled along the channel upstream of the dam, the dam acts as an obstruction which causes the mass to build up behind the dam until reaching a level whereby parts are permitted to flow over the upper edge of the dam. The dam, however, acts as a severe flow restriction such that the flowing mass is no longer capable of undergoing a helical tumbling movement in the region upstream of but located closely adjacent the dam. The net result is that the individual parts, when flowing over the top of the dam, effectively flow over the dam in a relatively thin layer spread out along the length of the dam, which layer will not have any significant depth of parts, and in addition the parts will be predominantly moving lengthwise of the channel since the dam will have effectively stopped the transverse tumbling or rotatable movement which exists upstream in the unimpeded portion of the vibratory channel. The parts flowing over the dam hence are thus undergoing a significantly different movement, and the overall mass of the parts flowing over the dam has a significantly different makeup, than exists in the

vibratory channel at a location substantially upstream of the dam. German '680 discloses that the blasting nozzle 12 is preferably positioned over the dam so that the parts hence are blasted with the ejected blast material as they cross the dam. For example, and referring to the English translation, page 6, 5th line from bottom, it is stated that "As soon as they cross the dam section 5, they are blasted with blast material from the nozzle 12 above the dam section 5", and on page 9 starting in line 9 it is stated that "the blast opening is provided on the dam section 5, there where the operation of the workpieces is most active, the most effective blasting treatment can take place". This is further emphasized in the description of the German '680 invention appearing on page 3 of the translation, starting seventh line from bottom, which states "When the finishing polishing mechanism of the vibration swivel type and the blast outlet opening of the blasting mechanism are mounted above the dam section of the finishing container, the blasting material can be sent out when the workpieces pass the dam section. An optimum position is thus achieved in order to carry out the blasting operation.".

The German '680 patent illustrates a further embodiment in Figures 4-6 wherein the downstream end of the vibrating channel communicates with an inclined plate 120 which causes the parts in the flowing mass to move upwardly onto a raised screen 121, which screen 121 can have a rubber mat 125 positioned thereon onto which the parts are positioned after they flow up the inclined plate 120. The parts hence flow from the helically tumbling mass up the inclined plate 120 so as to pass onto the mat 125 associated with the screen 121. When in this latter disposition, particularly as they flow up the inclined plate 120, the parts are again no longer moving with a helical tumbling movement, but rather are effectively being linearly advanced along the plate and screen and are effectively again disposed in a relatively thin layer extending across the width of the plate and screen. German '680 again positions the blasting nozzle over the raised

screen 121 so that the blasting hence acts on the thin layer of parts which are positioned on the screen and are moved in a vibratory manner lengthwise therealong. The parts when subjected to the blasting spray hence are no longer undergoing a helical tumbling movement, and accordingly the parts are treated in substantially the same manner as when they are treated while flowing over the dam associated with the embodiment of Figures 1 and 2.

German '680 hence merely teaches a vibratory device which can be used for its usual purpose, and which can be additionally used for feeding a flowing mass into a blasting station which permits blast treating of the parts. The blasting station according to the teaching of German '680, however, does not occur while the flowing mass is undergoing a gentle helical tumbling movement. Rather, German '680 recognizes and teaches only that the blasting occurs after the helical tumbling movement has been effectively stopped, and occurs only when the parts are now spread out in a thin layer and are moving substantially linearly through the blasting zone. It is hence believed abundantly clear that German '680 clearly did not recognize the desirability of blasting directly into the helically tumbling bulk mass, such as in the present invention, and in fact all of the teachings in German '680 (as evidenced by both embodiments thereof) teach directly away from the present invention by suggesting that the optimum blasting occurs when the parts are moving substantially linearly in a thin layer after leaving the helically flowing region of the apparatus.

While the two embodiments of German '680 both clearly relate to arrangements where the vibrating treatment and the blasting are accomplished separately while utilizing effectively a single modified mechanism, the Examiner in the last Office Action appears to be relying on the statement which appears in the translation (page 9, line 8) which states that the "blast opening can be arranged at any point of the finishing container". This latter statement, however, must be

evaluated in view of the overall disclosure and teaching of German '680. The statement is one of several which appears with respect to the embodiment of Figures 1-3, which embodiment employs a circular treating channel wherein the input is at a lower elevation and is disposed substantially directly below the raised output end of the channel, with the dam being connected at this point. This Figures 1-3 embodiment hence does require that the dam be at a precise location relative to the channel, rather than at any location therealong. The quoted statement in the translation (page 9, line 8) hence merely implies that the Figures 1-3 embodiment represents an optimum configuration but does have a restriction with respect to the location of the blasting, and that the use of an overall annular vibratory tub would permit the blasting to occur at other locations, although German '680 does not specifically state or even imply that the blasting would occur directly on the helically moving mass. Rather, the Examiner is inferring this based on a hindsight teaching of the present invention.

Rather, it is submitted that the statement in the translation (page 9, line 8) must be interpreted in light of the overall disclosure of German '680, and in fact appears to reference a variation which more closely conforms to the embodiment of Figures 4-6 wherein the vibrating mass is lifted up onto a screen which enables the layered parts to then be blasted when separated and isolated from the vibrating helically-flowing mass. The arrangement of Figures 4-6 is one which enables the screen and hence the blasting station defined thereby to be located circumferentially at any location along the vibratory path. It is submitted that the statement in the translation at page 9, line 8 hence, when interpreted in a manner consistent with the disclosure of German '680, must still be interpreted to require and imply that the blasting and the vibrating are separate treating functions which can be carried out simultaneously or individually, but which are not mixed together. In fact, the

background discussion in German '680, and the overall purpose associated with the disclosures of the different embodiments, clearly indicates that German '680 always contemplates and in fact only teaches that the blasting and the vibratory treating of the parts are wholly separate from one another. Absent the teaching derived from study of Applicant's disclosure, it is submitted that one of ordinary skill in this art, when reading the German '680 patent, would derive therefrom only a teaching that the blasting and the vibratory treating are separate and distinct operations which can be carried out utilizing a single apparatus. The teachings of German '680 hence teach directly away from the present invention, particularly since the patent clearly points out that optimum blasting occurs when the parts are moving substantially linearly in a thin layer after leaving the helically flowing region of the apparatus. This latter conclusion by German '680 is clearly contrary to the present invention and hence unequivocally leads only to the conclusion that German '680 neither contemplated nor in any way suggests the desirable process disclosed and claimed in this application.

With respect to main Claim 29 as currently pending herein, this claim defines the treating process as including the following steps:

> "vibrating the tublike device to cause the mass of solid elements, when supplied to the channel, to flow lengthwise of the channel while undergoing a corkscrew-like motion wherein the elements undergo a gentle rotatable tumbling movement through numerous closely-adjacent transverse convolutions with the forward advance per convolution as the mass slowly moves lengthwise along the channel being less than the width of the channel;
>
> providing a spray arrangement positioned adjacent the channel so that a discharge orifice thereof is positioned closely adjacent and above the flowing mass and is oriented generally downwardly toward the flowing mass as it advances slowly along the channel with said corkscrew-like motion;
>
> discharging from said orifice an abrasive spray comprising a high-velocity fluid carrier having

small abrasive particles entrained therein and directed generally downwardly into the flowing mass to define a concentrated spray zone which contacts a small concentrated surface area of the upper surface of the flowing mass and which penetrates a substantial distance downwardly into the flowing mass to effect treating of multiple surfaces of the parts as they slowly tumble during their passage through the spray zone during the corkscrew-like movement of the flowing mass, the abrasive spray contacting the surface area of the flowing mass over a majority of the width of the channel and over a lengthwise extent which equals or slightly exceeds the lengthwise forward advance defined by adjacent transverse convolutions of the flowing mass; and

continuing the corkscrew-like motion of the flowing mass downstream away from the spray zone".

As is believed apparent from the discussion relative to German '680 above, the basic process of the invention as defined by Claim 29 is not believed taught or even remotely suggested in the German patent. Further, with respect to the present invention when evaluated in greater detail, the invention has discovered the desirable aspects associated with blasting or spraying the flowing mass during its helical or corkscrew movement by concentrating the spray zone relative to the flowing mass so that the convolutions of the mass during its helical movement have an advancing distance which is equal to or less than the lengthwise extent of the spray zone. This hence ensures that substantially the entirety of the flowing mass, as the parts undergo a gentle tumbling movement transversely of the channel as they advance from convolution to convolution, will pass into and through the spray zone so as to provide uniform and effective blasting thereof. This is important so as to provide for uniform and optimum treating of the large quantity of parts contained in the flowing mass, thereby effectively treating the parts yet at the same time avoiding excessive blasting or treating thereof, and +additionally providing highly effective and efficient operation by permitting the parts to be effectively supplied

into, moved along and then discharged from the channel so as to permit a first-in first-out treating of the parts.

The overall process of Claim 29, as well as the specific details thereof as additionally discussed above, are clearly neither suggested nor taught by German '680. Claim 29 is accordingly believed to patentably distinguish over German '680 under both 35 USC 102 and 35 USC 103.

Claims 30-41 all depend from Claim 29 and are believed allowable therewith for the same reasons. These claims also define additional limitations which are believed to additionally patentably distinguish over German '680. For example, Claim 30 includes the step of maintaining the abrasive in the helically flowing mass after it leaves the spray zone, whereas German '680 tends to suggest that the abrasive is always separated at the spray zone. Claim 33 defines the apparatus having a second spray zone which provides for different treating of the parts, and German '680 contains no suggestion of this process.

Claim 42 is a further independent claim which again defines the general process and is believed to distinguish over German '68 for the same reasons set forth above. Claim 42 further defines more refined details associated with the process in terms of the spray zone and its relationship to the advancement of the convolution so as to provide for optimum blasting of parts as they helically traverse the guide channel. Claim 42, together with Claims 43-46 dependent therefrom, are hence believed to patentably distinguish over the German '680 patent.

If the Examiner has any questions relative to the above, then she is requested to telephone the undersigned at the number listed below so as to hopefully expedite further handling of this application.

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Further and favorable consideration of this application, and allowance of same, is respectfully requested.

Respectfully submitted,

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4-20-04

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Encl: Amended Figures 5 and 6 (1 formal drawing sheet)
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